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Immunogenicity in humans of a recombinant bacterial antigen delivered in a transgenic potato

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Compared with vaccine delivery by injection, oral vaccines offer the hope of more convenient immunization strategies and a more practical means of implementing universal vaccination programs throughout the world. Oral vaccines act by stimulating the immune system at effector sites (lymphoid tissue) located in the gut. Genetic engineering has been used with variable success to design living and non-living systems as a means to deliver antigens to these sites and to stimulate a desired immune response¹⁴. More recently, plant biotechnology techniques have been used to create plants which contain a gene derived from a human pathogen; the resultant plant tissues will accumulate an antigenic protein encoded by the foreign DNA⁵¹⁰. In pre-clinical trials, we found that antigenic proteins produced in transgenic plants retained immunogenic properties when purified; if injected into mice the antigen caused production of protein-specific antibodies⁶. Moreover, in some experiments, if the plant tissues were simply fed to mice, a mucosal immune response occurred⁷¹⁰. The present study was conducted as a proof of principle to determine if humans would also develop a serum and/or mucosal immune response to an antigen delivered in an uncooked foodstuff.

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